



Cave Restoration in Austin

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The City of Austin overlies an underground frontier



Painting by Kathy Rottier commissioned by the Barton Springs/Edwards Aquifer Conservation District

HISTORICALLY CAVES WERE FILLED IN ACROSS AUSTIN FOR MANY REASONS



Caves were filled to reduce hazards to livestock, dispose of trash, or make land more marketable for future development



Waste Disposal



PIONEERS AND RANCHERS WORKED TO KEEP WATER AT THE SURFACE



Sinkhole plugged to make stockpond on Dahlstrom Ranch

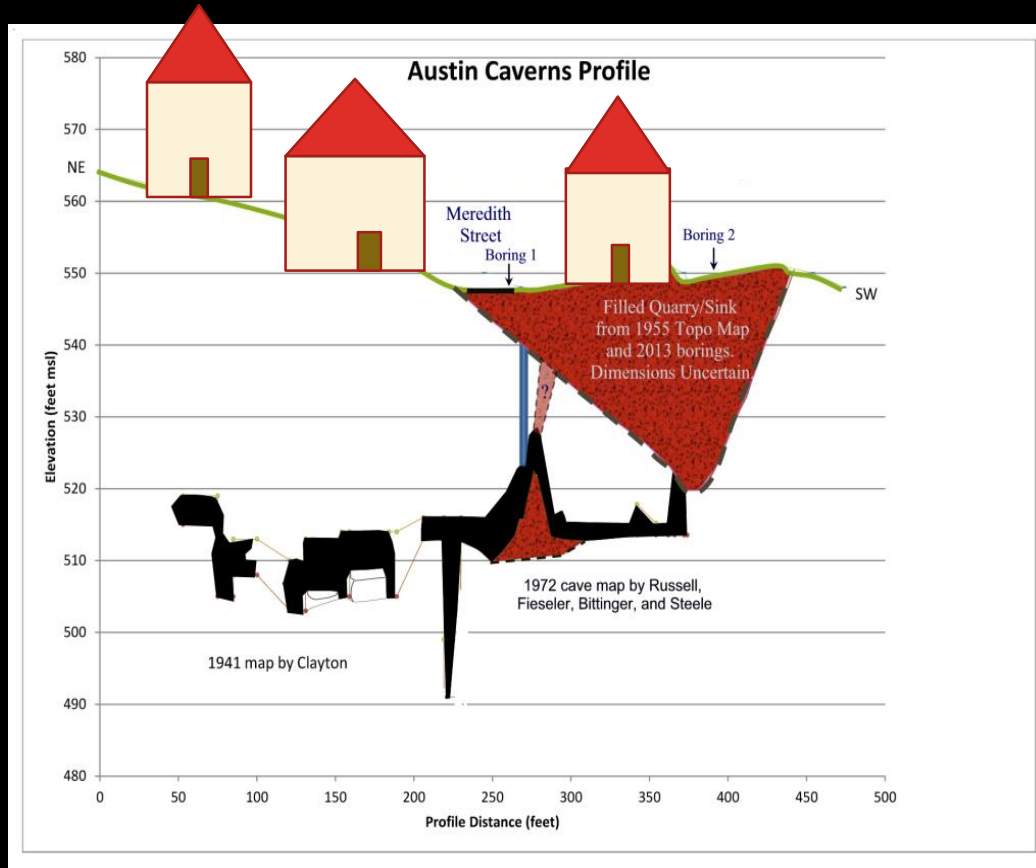
Blanco River



During the 1890s this site, where water flowed into a cavern, was plugged to provide flow for a downstream mill near Kyle.

URBAN GROWTH

- Austin's first commercial cave in Tarrytown was built over in the 1950s. Its entrance is now a stormwater drain inlet
- Local flooding occurs when cave backs up with excessive runoff



CAVE LIFE

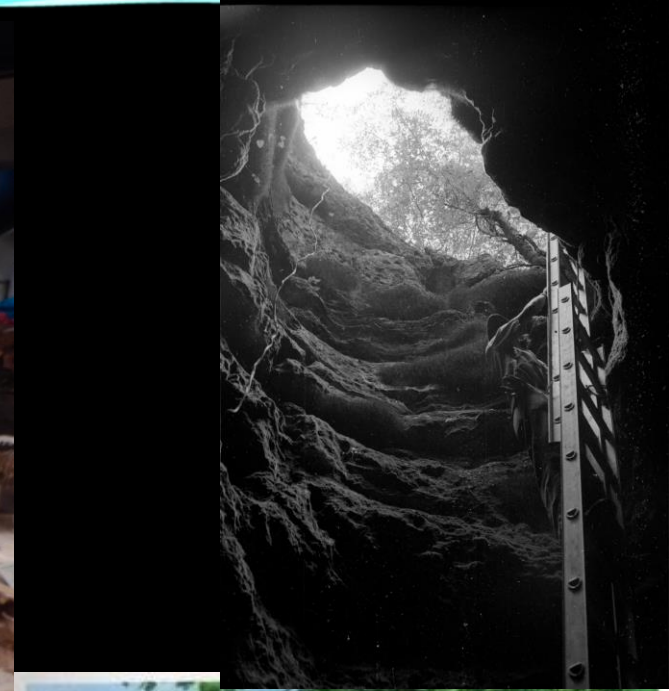
- The 1996 City of Austin/Travis County Balcones Canyonland Conservation Plan (BCCP) permit protects 62 caves, springs, and endangered songbird habitat
- The 1996 federal permit for Barton Springs salamander (*Eurycea sosorum* and *Eurycea waterlooensis*)
- April 8, 2010, Mayor Lee Leffingwell and Austin City Council proclaim the bat as Austin's official mascot. Bats sought out artificial structures after most of their natural cave habitat was filled or gated.



CAVERS TO THE RESCUE

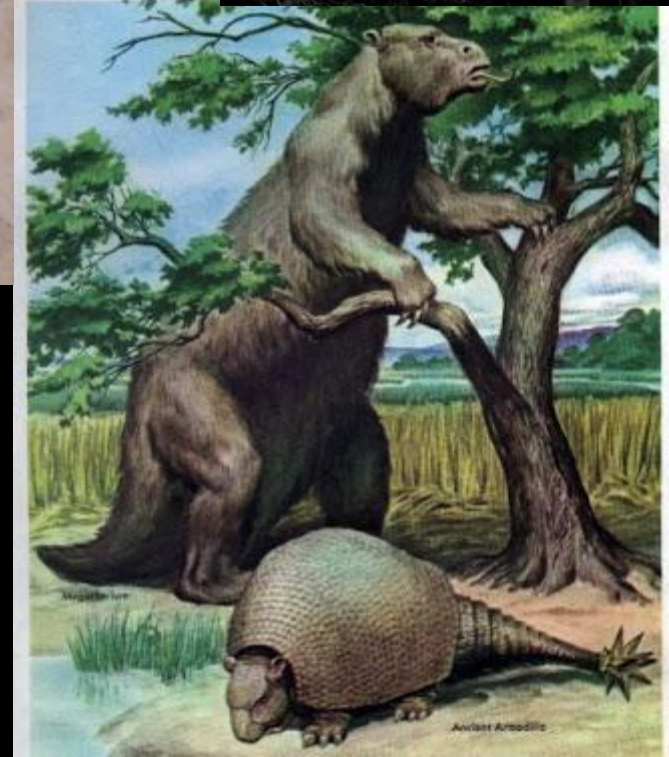
- Historically cave-trained volunteers associated with cave groups like UT Grotto and Texas Speleological Survey. (TSS) reopened most caves we know of, mapped, protected, and conducted biological surveys.
- Most of the 62 federal permit caves on City of Austin/Travis County permit were discovered and mapped by cavers, some requiring over a year of extensive exploration and reaching 250 feet deep.
- By 1990, 20% of the 163 Austin caves the TSS documented had been refilled or destroyed



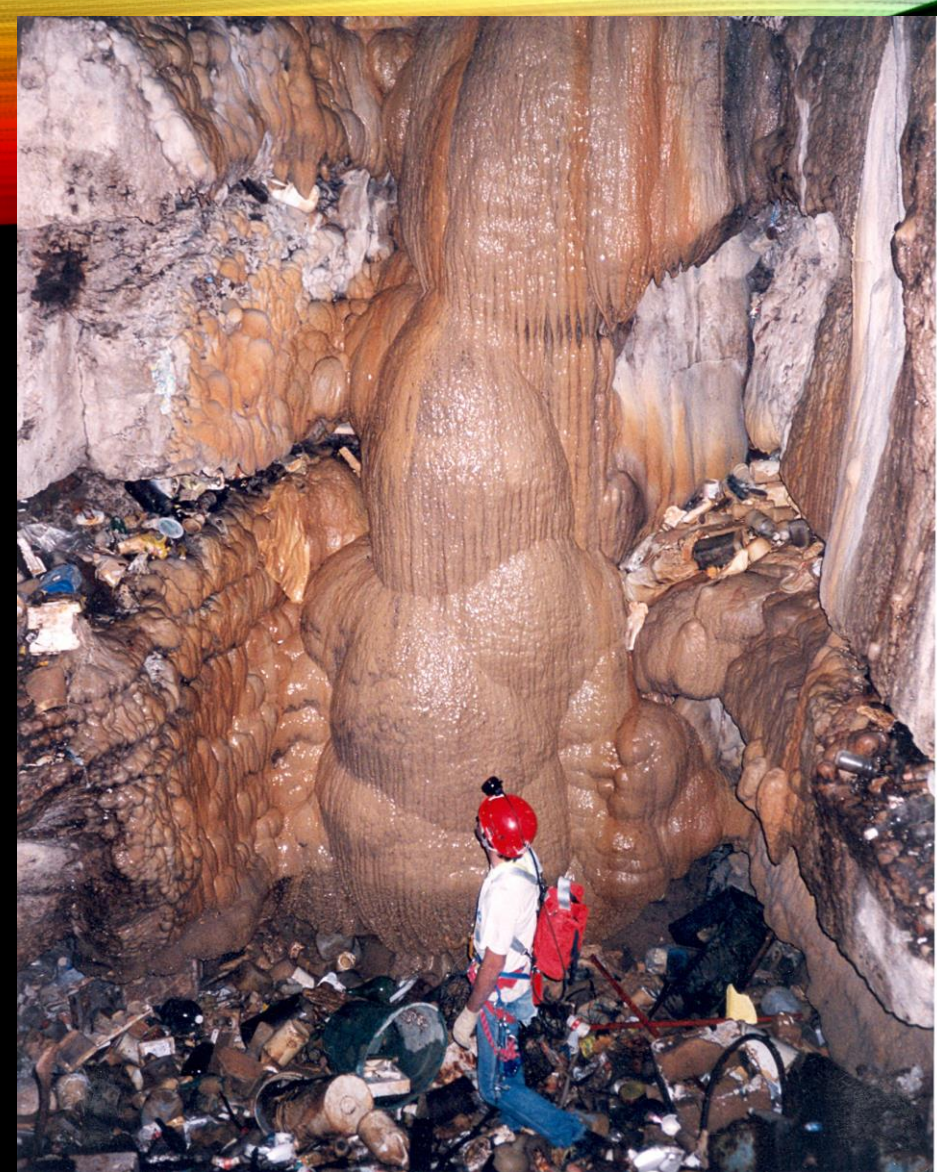


Ancient Life Recorded in Caves

Scientists like Ernie Lundelius of Texas Memorial Museum, Dr. Jay Banner of UT, and Larry Meissner of Concordia Univ. found records of early Texas history preserved in caves

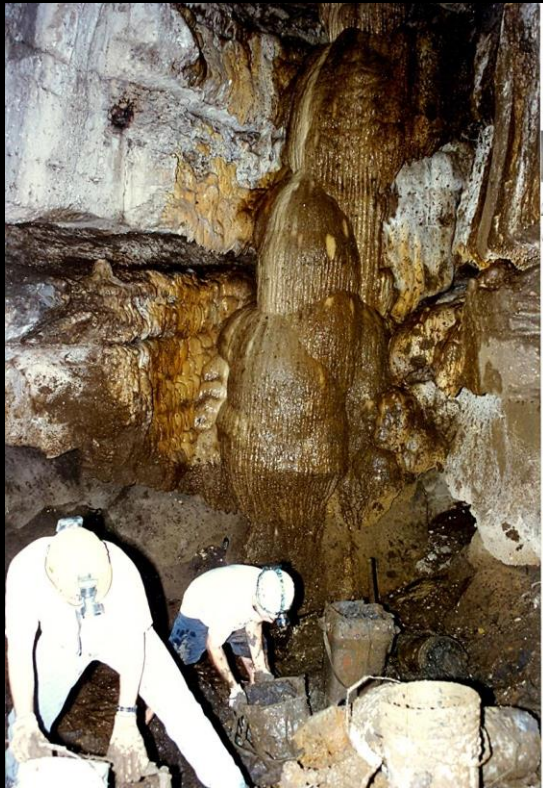


Midnight Cave in Slaughter Creek Metro Park, former Circle C Ranch trash cave and BCP permit cave as it looked in 1993 prior to restoration completed in 1999.



Mark Sanders CoA biologist (originally Parks & Rec. now Austin Water BCP) coordinated volunteers for 6 years to complete the seemingly impossible cleanup. He participated in the cleanups of many other caves and regularly surveys the fauna in many caves since the 1990s to help protect them.

MIDNIGHT CAVE CLEANUP 1993-1999



Photos by Mark Sanders

RESTORED MIDNIGHT CAVE SLAUGHTER CREEK METRO PARK

The 1996 BCCP Habitat Conservation Plan requires that the permit caves are maintained and that trash and debris are removed.



2016 photo by Jeff Nichols

2013-2016

**WATERSHED PROTECTION DEPT
RESTORATION OF 5 SINKHOLES
ON 200 ACRE BLOWING SINK
PRESERVE**

- Blowing Sink Cave is one of the 62 federal permit caves that cavers explored 240 feet down to the water table.
- Blowing Sink Preserve contained numerous large sinkholes and cave and was acquired by the City of Austin
- In 2013 cave staff and Zara Environmental LLC were hired to restore 5 plugged and collapsing sinkholes on Blowing Sink Preserve



Sinky Dinky collapsing in 2010



Sinky Dinky restored in 2015



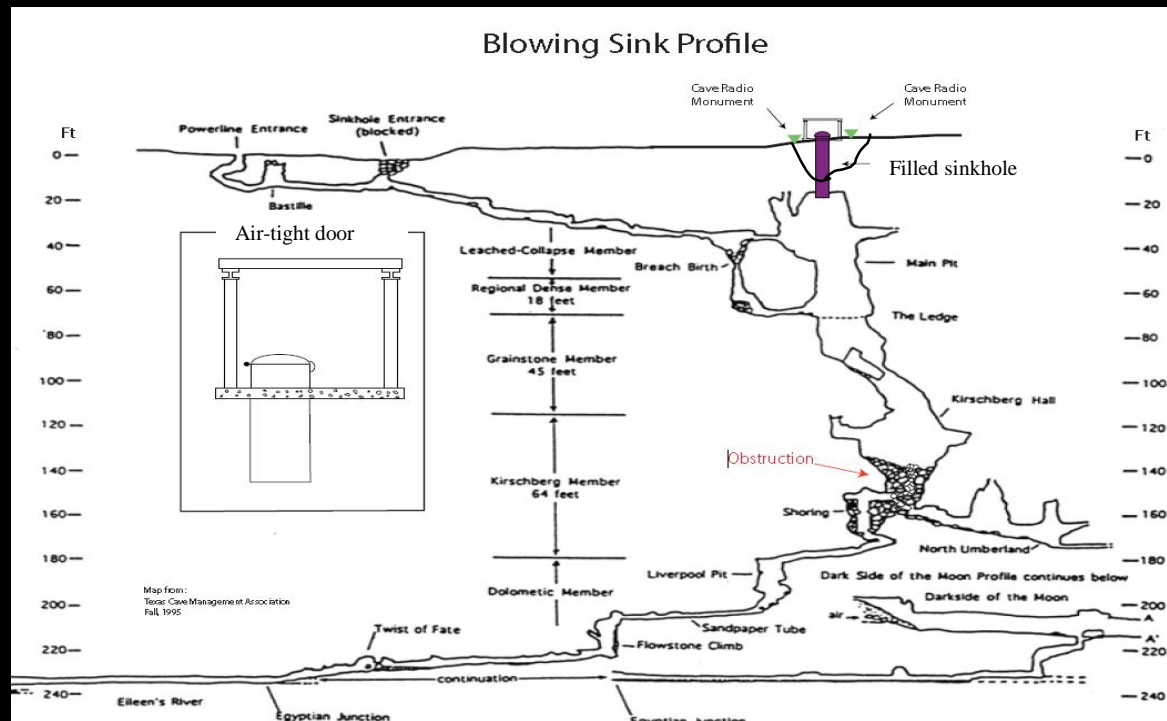
Brownlee Sink is plugged in 2012, ponding 4 feet deep pond



Brownlee Sink is restored in 2015, taking in all runoff

BLOWING SINK CAVE RESTORATION

- Blowing Sink Cave is one of the most significant caves on the federal permit, being the deepest as cavers explored it down to the water table.
- In Oct. 2013, before the sinkholes restoration could be initiated across the Blowing Sink Preserve, a storm pummeled Blowing Sink Cave with runoff, and plugged access to the lower portion of the cave, which has not been accessed since.
- The BCP Habitat Conservation Plan requires access be maintained for water sources, regular faunal surveys, and water sampling.
- BCP has contracted one of the original explorers on Blowing Sink to reopen a filled sinkhole over the cave so that the obstruction can be removed.



WILDFLOWER CAVE



- Caver volunteers, Wildflower Center staff, with city staff removed trash filling Wildflower Cave by the mid 1990s.
- Since 2000, Watershed educators take up to 1,700 Title I 4th and 5th graders through Wildflower Cave.
- While not a federal permit cave, the BCCP HCP, BCP karst land management plan, and City permits such as NPDES, require that public education be conducted of cave ecosystems and aquifer, specifically through cave tours.
- This education is being conducted through a variety of programs including Watershed Protection, Parks & Recreation Nature and other activity centers, Texas Cave Management Association, and BCP.



Watershed Protection Department educators



Cave Day was held Feb.10 2018 at the Wildflower Center, opening up caves to the public

2012-2016 CIP PROJECTS FOR CAVE RESTORATION

- Increasing public demand for cave tours and few suitable caves were available.
- Traffic in BCP permit caves increased from about 500 in 1993 to about 1,800 in 2017. The increase in permit cave traffic does not meet the HCP requirement to keep traffic at 1996 levels. A solution is to restore additional education caves.
- In 2012, Watershed Protection hired a team of 8 men and women cavers for CIP projects to restore caves to increase recharge and education resources.



CAVE EDUCATION SUCCESS

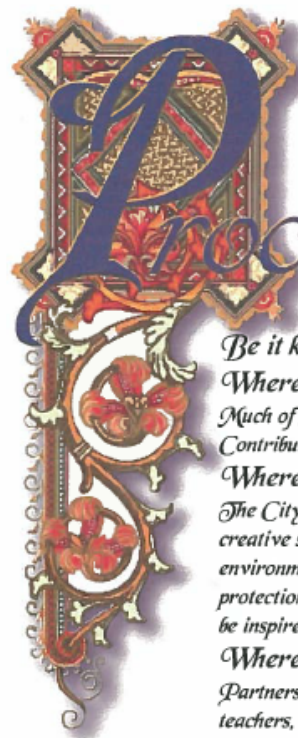
- The Watershed Protection Dept 2012-2016 CIP cave projects successfully restored formerly filled caves such as LaCrosse, Grassy Cove, Bowie High School cave, and partially restored caves at Wade Sink and Hideout at the Goat Cave Karst Preserve.
- Each cave was gated to protect the public and the cave ecosystem.
- In 2017, 3,243 individuals were toured in newly created education caves, only 1,794 toured in permit caves.
- Additional education caves must be developed both to accommodate a growing need and to bring permit cave traffic down to about 800 -1,000 annually.



The mayor proclaimed April 11, 2018 Educational Cave Restoration Day

For the Watershed Protection Dept cave restoration project:

- Jessica Wilson was CIP grant manager
- Chris Herrington and Mike Kelly facilitated the funding
- Nico Hauwert supervised the cave team and contractors



Proclamation

Be it known that

Whereas,

Much of Austin is located over the environmentally sensitive Edwards Aquifer Recharge or Contributing Zones; and

Whereas,

The City of Austin Watershed Protection's Educational Cave Restoration Team has found creative solutions to create and enhance underground classrooms and provide safe and accessible environments to teach about underground habitats, aquifer dynamics, and water quality protection; each year, thousands of community members have the rare opportunity to enter and be inspired by the underground world; and

Whereas,

Partnerships have been formed and enhanced to better use these caves to educate students, teachers, and the general public about the environmentally sensitive Edwards Aquifer Recharge Zone, and inspire them to be environmental stewards; and

Whereas,

The Educational Cave Restoration Team was the recipient of the Barton Springs Edwards Aquifer Conservation District's 2017 Groundwater Stewardship Innovation Award;

Now, Therefore,

I, Steve Adler, Mayor of the City of Austin, Texas, do hereby proclaim

April 11th, 2018

as

Educational Cave Restoration Day

in Austin.

In witness whereof, I have hereunto set my hand and caused the seal of the City of Austin to be affixed this 11th Day of April in the Year Two Thousand Eighteen

Steve Adler, Mayor, City of Austin

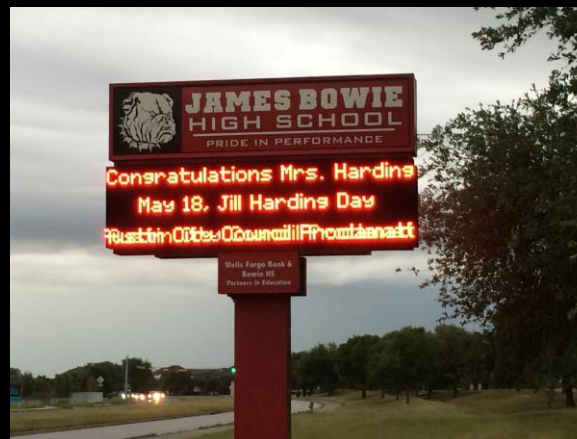
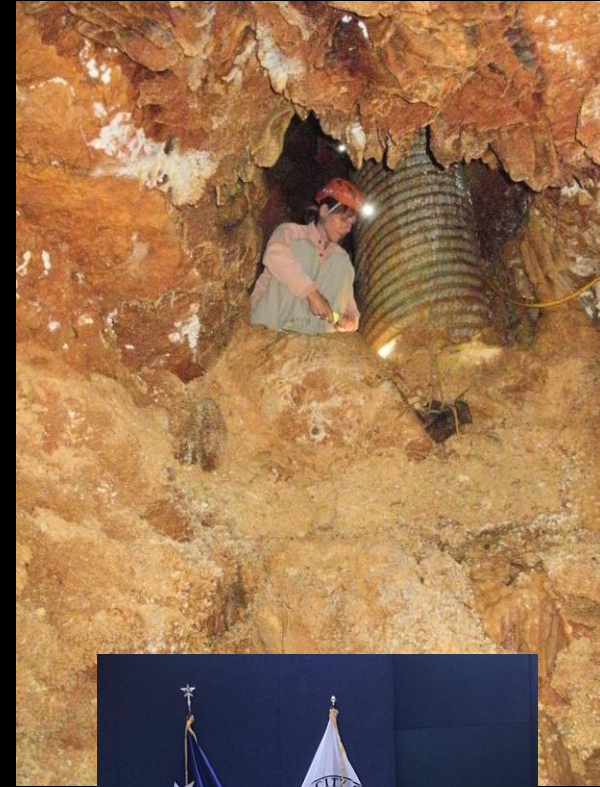
Caves in the Schools

BOWIE HIGH SCHOOL CAVE

Science teacher Jill Harding worked to restore the cave for education access since the 1990s, including drilling an access shaft and student excavation.

Watershed Protection education manager Jessica Wilson funded restoration of the cave in 2015-2016. Watershed staff cavers removed fill from the cave.

Teacher Jill Harding was recognized by Austin City Council on May 18, 2017 for her efforts.



MCNEIL HIGH SCHOOL

- Science teacher Tina Vick and her class revegetating the courtyard to boost the Millipede cave ecosystem
- BCP hopes to restore the partially sediment and concrete-filled caves both for education and to enhance the cave ecosystem



CAVES CAN BE DISCOVERED AND RESTORED DURING ENVIRONMENTAL ASSESSMENTS



Trash-filled Tire Sink on proposed Jeremiah Ventures Development-now Hudson WQPL.



- The BCP HCP states: *“If during investigations for development of a tract, karst features are discovered with a significant diversity of troglobitic fauna, those karst features may be submitted to the USFW for consideration for exchange with karst features identified for protection by the BCCP.”*
- *The Jeremiah Ventures Assessment and restoration used staff from Watershed Protection, Barton Springs/Edwards Aquifer Conservation District, and Zara Environmental*

ANTS IN THE PANTS CAVE DISCOVERY ON JEREMIAH VENTURES ASSESSMENT



Very subtle depression observed blowing air by Joe Beery of BS/EACD



With excavation is revealed to be a filled cave



**TABOR CREVICE CAVE FOUND BY WATERSHED
CAVE TEAM DURING PRE HWY45 ASSESSMENT OF
ADJACENT WQPL**



WHO ARE THE CAVE STEWARDS?

Cave restoration is conducted by a small group of cave-trained people.

They are trained to enter small spaces and accustomed to getting dirty.

UT Grotto is a local cave club that offers extensive skills training and mentoring that is required for safe caving.



Park Rangers

SUMMARY

- Most caves in Austin were historically filled and are difficult to detect.
- Cave restoration can:
 1. Increase recharge,
 2. Remove water-quality contaminants (trash fill),
 3. Locally reduce flooding,
 4. Provide habitat for listed endangered and rare cave invertebrates, endangered salamanders and Austin's mascot the bat, Provide resources for public education and opportunities for Austin to experience its natural heritage, and
 5. Help the City of Austin comply with federal permit requirements

END



See 8 min video of 2017 cave restoration of Wade Cave at: <https://youtu.be/Lr4FvKwiwtA>